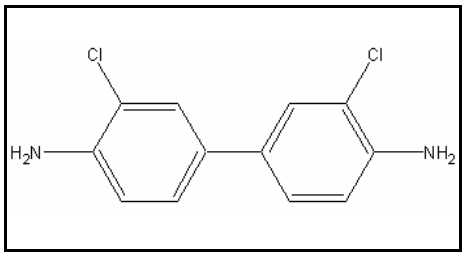
Indiana Department of Environmental Management
Office of Water – Water Quality Standards Section

TIER I HUMAN HEALTH CANCER CRITERIA

3,3'-DICHLOROBENZIDINE

CAS RN:	91-94-1
Water Solubility:	12.3 mg/L
Log K_{ow}:	3.57^{P}
Risk Associated Dose:	2.2×10^{-5} mg/kg/day
Carcinogenicity Weight-of-Evidence Classification:	Class B2; Probable human Carcinogen



Standard

The human health cancer 3,3'-dichlorobenzidine criterion for drinking water sources is 0.43 µg/L. The human health cancer criterion for nondrinking water sources is 0.95 µg/L.

Calculations

Bioaccumulation Factor:

BAF predicted based on Log K_{ow}
Log K_{ow} = 3.57 (CLOGP), K_{ow} = 3715
Trophic level 3 FCM = 1.103; trophic level 4 FCM = 1.023

$f_{fd} = 1/(1+(0.00000024 \text{ kg/L})(K_{ow})) = 0.999$

Baseline $BAF_{T3} = (FCM)(K_{ow}) = (1.103)(3715) = 4098$

Baseline $BAF_{T4} = (1.023)(3715) = 3800$

Human health $BAF_{T3} = [(4098)(0.0182)+1](0.999) = 75.52$

Human health BAF_{T4} = [(3800)(0.0310)+1](0.999) = 118.7

Risk Associated Dose:

From the IRIS database:

$RAD = 0.00001/q1^{*} = 0.00001/0.45$
$= 2.2 \times 10^{-5}$

Where:

RAD = Risk Associated Dose (mg/kg/day)
$q1^{*}$ = Cancer Slope Factor

Calculation of Criteria:

Non Drinking Water HCC =$[(2.2 \times 10^{-5})(70)]/0.01+[(0.0036)(75.52)+(0.0114)(118.7)]$

= **0.95 µg/L**

Drinking Water HCC = $[(2.2 \times 10^{-5})(70)]/2+[(0.0036)(75.52)+(0.0114)(118.7)]$

= **0.43 µg/L**

References

1. USEPA 1993. Integrated Risk Information System (IRIS database) chemical file for 3,3'-Dichlorobenzidine (CASRN 91-94-1).

2. Leo,A. and D.Weininger 1997. Daylight Software CLogP Version 3.15+ for Unix Pomona Medical Chemistry Project, Pomona College, Claremont, CA. Distributed by Daylight Chemical Information Systems, Inc., 3952 Claremont St., Irving, CA 92714 (Reference for the Log K_{ow})

Acronyms

ADE	Acceptable Daily Exposure
BAF	Bioaccumulation Factor
CAS RN	Chemical Abstract Service Registry Number
FCM	Food Chain Multiplier
IRIS	Integrated Risk Information System
K_{ow}	Octanol-Water Partition Coefficient
LOAEL	Lowest observed adverse effect level
NOAEL	No observed adverse effect level
P (superscript)	Predicted value
UF	Uncertainty factor

Revision History

June 21, 1999 - Criteria first developed
April 13, 2000 – Fact sheet updated. No modifications made to criteria.

Contact Information

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